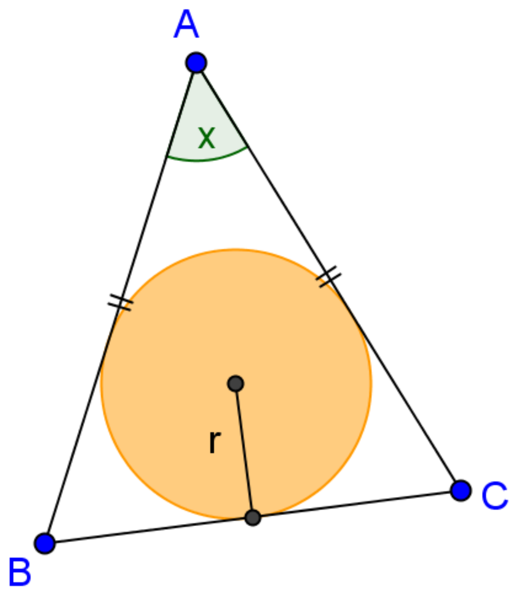

This is just ONE way to derive this relationship.
There are two area formulas that come into play:

$$Area=\frac{1}{2}(AB)(AC)\sin(x)$$

which I refer to as the SAS Area formula, and

$$Area=rs$$

where r is the inradius and s is the semi perimeter.

Combining these two area formulas, we solve for the radius r in terms of x and one of the legs (which we hold constant.

$$rs=\frac{1}{2}(AB)(AC)\sin(x)$$

$$rp=(AB)(AC)\sin(x)$$

Multipying both sides by 2 give leads to $2s$ on the left side, which is the perimeter p.

$$rp=(AB)^2\sin(x)$$

AB=AC

$$r(AB+AC+BC)=(AB)^2\sin(x)$$

$$r=\frac{(AB)^2\sin(x)}{AB+AC+BC}$$

$$r=\frac{(AB)^2\sin(x)}{2\text{AB}+BC}$$

$$r=\frac{(AB)^2\sin(x)}{2\text{AB}+\sqrt{AB^2+AC^2-2(AB)(AC)\cos(x)}}$$

Using the Law of Cosines to express BC in terms of x and the legs of the triangle.

$$r=\frac{(AB)^2\sin(x)}{2\text{AB}+\sqrt{AB^2+AB^2-2(AB)(AB)\cos(x)}}$$

$$r=\frac{(AB)^2\sin(x)}{2\text{AB}+\sqrt{2\text{AB}^2-2(AB)^2\cos(x)}}$$

This allows us to express the area in terms of *x* and the legs (which are held constant).

$$Area = \pi r^2$$

$$Area = \pi \left(\frac{(AB)^2 \sin(x)}{2\mathrm{AB} + \sqrt{2\mathrm{AB}^2 - 2(AB)^2 \cos(x)}} \right)^2$$

This formula for the area is actually different from the formula in the applet.